Issued date : April 21, 2011

PRODUCT SAFETY DATA SHEET

1. Product and Company Identification

Name of Product Lithium-Ion battery (or, Lithium-Ion secondary battery)

Model name Please see attached sheet (Applied Model Name)

Name of Company : Panasonic Corporation
Address : 1-1,Matsushita-cho,Moriguchi,Osaka 570-8511 Japan
Department : Energy Company Lithium-Ion Battery Business Unit
Representative : Iichiro Mori
Telephone number : +81-6-6991-1141
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For emergency : +81-6-6991-1141

Document number: LIP-PSDS-2011-166

2. Composition / Information on Ingredients

Substance : Lithium-Ion battery
CAS number : Not specified
UN Class : Even classified as lithium ion batteries UN3480 or UN3481(Contained in Equipment or Packed with Equipment) the product is handled as Non-Dangerous Goods by meeting the UN Recommendations on the Transportation of Dangerous Goods Model Regulations Special Provision SP188 and IATA Dangerous Goods Regulations Packing Instruction 965-967 General Requirement and Section Ⅱ (Excepted) is applied for air transportation, IMDG Code SP188 is applied for marine transportation. (1)(2)(3)

Composition : Positive electrode;

Cell Type A; Lithium cobalt oxide	20－35wt%
Cell Type B; Lithium nickel manganese cobalt oxide	20－35wt%
Cell Type C; Lithium nickel oxide	20－35wt%
Negative electrode; Carbon	10－20wt%
Electrolyte; Organic electrolyte (mainly composed of alkyl carbonate)	10－20wt%
Enclosure; Plastic	

3. Summary of Hazard

Class name : Not applicable for regulated class
Hazard : It may cause heat generation or electrolyte leakage if battery terminals contact with other metals. Electrolyte is flammable. In case of electrolyte leakage, move the battery from fire immediately.

Toxicity : Vapor generated from burning batteries, may make eyes, skin and throat irritate.

4. First Aid Measures

The product contains organic electrolyte. In case of electrolyte leakage from the battery, actions described below are required.

Eye contact : Flush the eyes with plenty of clean water for at least 15 minutes immediately, without rubbing. Take a medical treatment. If appropriate procedures are not taken, this may cause an eye irritation.

Skin contact : Wash the contact areas off immediately with plenty of water and soap. If appropriate procedures are not taken, this may cause sores on the skin.

Inhalation : Remove to fresh air immediately. Take a medical treatment.

5. Fire Fighting Measures

Extinguishing method : Since vapor, generated from burning batteries may make eyes, nose and throat irritate, be sure to extinguish the fire on the windward side. Wear the respiratory protection equipment in some cases.

Fire extinguishing agent : Plenty of water and alcohol-resistant foam are effective.

6. Measures for Electrolyte Leakage from the Battery

- Take up with absorbent cloth.
- Move the battery away from the fire.

7. Precaution for Handling and Storage

- When packing the batteries, do not allow battery terminals to contact each other, or contact with other metals. Be sure to pack batteries by providing partitions in the packaging box, or in a separate plastic bag so that the single batteries are not mixed together. (1)(2)(3)
- Use strong material for packaging boxes so that they will not be damaged by vibration, impact, dropping and stacking during their transportation. (1)(2)(3)
- Do not let water penetrate into packaging boxes during their storage and transportation.
- The batteries will be stored at room temperature, charged to about 30－50% of capacity.
- Do not store the battery in places of the high temperature exceeding 35 deg. C or under direct sunlight or in front of a stove. Please also avoid the places of high humidity. Be sure not to expose the battery to condensation, water drop or not to store it under frozen condition.
- Batteries are sure to be packed in such a way as to prevent short circuits under conditions normally encountered in transport. (1)(2)(3)
- Please avoid storing the battery in the places where it is exposed to the static electricity so that no damage will not be caused to the protection circuit of the battery pack.

8. Exposure Controls / Personal Protection (in case of electrolyte leakage from the battery)

Acceptable concentration : Not specified in ACGIH. (4)

Facilities : Provide appropriate ventilation system such as local ventilator in the storage place.
Protective clothing : Gas mask for organic gases, safety goggle, safety glove.

9. Physical and Chemical Properties of Single Cell

Appearance : Single cell: Cylindrical or Prismatic cell
Nominal voltage : Single cell: Please see attached sheet (Applied Model Name)

10. Stability and Reactivity

Since batteries utilize a chemical reaction they are actually considered a chemical product.
As such, battery performance will deteriorate over time even if stored for a long period of time without being used.
In addition, the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage.

11. Toxicology Information (in case of electrolyte leakage from the battery)

Acute toxicity : Oral (rat) LD50 >2g/kg (estimated)
Irritation : Irritating to eyes and skin.
Mutagenicity : Not specified.
Chronic toxicity : Not specified.

12. Ecological Information

- In case of the worn-out battery was disposed in land, the battery case may be corroded, and leak electrolyte. But, we have no ecological information.

Heavy metal in battery : Mercury(Hg) and Cadmium(Cd) are neither contained nor used in battery.

13. Disposal Conditions (Precautions for recycling)

- When the battery is worn out, dispose of it under the ordinance of each local government or the low issued by relating government.
- Disposal of the worn-out battery may be subjected to Collection and Recycling Regulation.

14. Transportation Information

- Even classified as lithium ion batteries UN3480 or UN3481(Contained in Equipment or Packed with Equipment), the product is handled as Non-Dangerous Goods by meeting the UN Recommendations on the Transportation of Dangerous Goods Model Regulations Special Provision SP188. (1)

(a) For a lithium-ion cell, the Watt-hour rating is not more than 20 Wh;
(b) For a lithium-ion battery, the Watt-hour rating is not more than100 Wh.
Lithium ion batteries subject to this provision shall be marked with the Watt-hour rating on the outside case, except those manufactured before 1 January 2009 ;
(c) Each cell or battery is of the type proved to meet the requirements of each test in the UN Manual of Tests

and Criteria, PartIII, sub-section 38.3 ;

(d) Cells and batteries, except when installed in equipment, shall be packed in inner packagings that completely enclose the cell or battery. Cells and batteries shall be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit. The inner packagings shall be packed in strong outer packagings ;

(e) Cells and batteries when installed in equipment shall be protected from damage and short circuit, and the equipment shall be equipped with an effective means of preventing accidental activation. When batteries are installed in equipment, the equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained;

(f) Except for packages containing button cell batteries installed in equipment (including circuit boards), or no more than four cells installed in equipment or no more than two batteries installed in equipment, each package shall be marked with the following:

(i) an indication that the package contains "lithium ion" cells or batteries, as appropriate;

(ii) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;

(iii) an indication that special procedures shall be followed in the event the package is damaged, to include inspection and repacking if necessary; and

(iv) a telephone number for additional information;

(g) Each consignment of one or more packages marked in accordance with paragraph (f) shall be accompanied with a document including the following:

(i) an indication that the package contains "lithium ion" cells or batteries, as appropriate;

(ii) an indication that the package shall be handled with care and that a flammability hazard exists if the package is damaged;

(iii) an indication that special procedures shall be followed in the event the package is damaged, to include inspection and repacking if necessary; and

(iv) a telephone number for additional information;

(h) Except when batteries are installed in equipment, each package shall be capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents: and

(i) Except when batteries are contained in or packed with equipment, packages shall not exceed 30 kg gross mass for marine transportation. (not exceed10kg for air transportation)

- For marine transportation the product is handled as Non-Dangerous Goods by meeting the IMO International Maritime Dangerous Goods (IMDG Code) 2010 Edition (Amendment 35-10) SP188 (Same as UN Special Provision SP188 above).(3)

- For air transportation the product is handled as Non-Dangerous Goods by meeting the IATA Dangerous Goods Regulations 52nd Edition Effective 1 January 2011 Packing Instruction 965-967 General Requirement and SectionII(Excepted) and UN Special Provision SP188 above.(2)

(j) Lithium ion batteries identified by manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

(k) Each package contains more than four cells or more than two batteries must be labeled with a lithium battery handling label.

* The width 120mm X length 110mm sized lithium battery handling label must be labeled onto the side of a package without bending it.

* The width 74mm X length 105mm sized lithium battery handling label may use for smaller packages.

(l) The words "Lithium ion batteries", "not restricted" and "PI number" must be included in the Additional

Handling Information on the air waybill, when an air waybill is used.
(PI number Cell and Battery : PI965, Packed with Equipment : PI966, Contained in Equipment : PI967)

(m) Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

(n) Except when batteries are installed in or packed with equipment, packages shall not exceed10kg gross mass.

- The Lithium-Ion cells or batteries as stated in Appendix are made in compliance to the requirements stated in the latest edition of the IATA Dangerous Goods Regulations Packing Instruction 965 General requirements and SectionⅡ, such that they can be transported as a NOT RESTRICTED (non-hazardous/non-dangerous) goods. However, if those lithium-ion cells or batteries are pack with or contained in an equipment, then it is the responsibility of the shipper to ensure that the consignment are packed in compliance to the latest edition of the IATA Dangerous Goods Regulations General requirements and SectionⅡ Packing Instruction 966 or 967 in order for that consignment to be declared as NOT RESTRICTED (non-hazardous/non-Dangerous).

- During the transportation of a large amount of batteries by ship, trailer or railway, do not leave them in the places of high temperatures and do not allow them to be exposed to condensation.

- During the transportation do not allow packages to be fallen down or damaged.

15. Regulatory Information

- UN (United Nations): Recommendations on the Transportation of Dangerous Goods Model Regulations Sixteenth revised edition
- ICAO (International Civil Aviation Organization) : Technical Instructions for the safety transport of dangerous goods by air 2011-2012 Edition
- IATA (International Air Transport Organization) : Dangerous Goods Regulations 52nd Edition Effective 1 January 2011
- IMO (International Maritime Organization) : International Maritime Dangerous Goods (IMDG) Code 2010 Edition (Amendment 35-10)

16. Other Information

References

(1) UN (United Nations) : Recommendations on the Transportation of Dangerous Goods Model Regulations Sixteenth revised edition

(2) IATA (International Air Transport Organization) : Dangerous Goods Regulations 52nd Edition, Effective 1 January 2011

(3) IMO (International Maritime Organization) : International Maritime Dangerous Goods (IMDG) Code 2010 Edition (Amendment 35-10)

(4) TLVs and BEIs 1999 ACGIH

Applied Model Name

Model Information			Cell		Battery Pack		
Model Name	Model No.	Manufacturer Model Name	Type	Nominal Voltage (V)	Rating Voltage (V)	Rating Capacity (mAh)	Watt-hour Rating (Wh)
AS07A51	BT.00605.020	CGR-B/6L4AE	B	3.6	10.8	4400	48
AS07B51	BT.00605.021	CGR-B/6L3AE	B	3.6	10.8	4400	48
AS07B52	BT.00805.011	CGR-B/8D9AE	B	3.6	14.4	4800	70
AS09A51	BT.00605.036	CGR-B/6N3AE	B	3.6	10.8	4400	48
AS09A56	BT.00605.037	NCR-B/629AE	C	3.6	10.8	5800	63
AS09B56	BT.00405.010	NCR-B/415AE	C	3.6	14.4	2900	42
AS09B58	BT.00805.012	NCR-B/802AE	C	3.6	14.4	5800	84
AS09D51	BT.00605.041	CGR-B/6N7AE	B	3.6	10.8	4400	48
AS09D51	BT.00605.054	CGR-B/6N7BE	B	3.6	10.8	4400	48
AS09D56	BT.00605.038	NCR-B/638AE	C	3.6	10.8	5800	63
AS09D56	BT.00605.053	NCR-B/638BE	C	3.6	10.8	5800	63
AS09F56	BT.00905.005	NCR-B/910AE	C	3.6	10.8	8700	94
BTP-ARJ1	BT.00605.024	CGR-B/6L2AE	B	3.6	10.8	4400	48
BTP-ASJ1	BT.00605.003	CGR-B/6E7AE	A	3.7	11.1	4800	54
CGR-B/6F9	BT.00605.005	CGR-B/6F9AE	B	3.6	10.8	4000	44
CGR-B/6H5	BT.00605.012	CGR-B/6H5AE	B	3.6	10.8	4000	44
GARDA53	BT.00605.027	NCR-B/611AE	C	3.6	10.8	5800	63
TM00751	BT.00605.022	CGR-B/6L5AE	B	3.6	10.8	4400	48
UM08A51	BT.00305.005	CGR-B/362AE	B	3.6	10.8	2200	24
UM08A51	BT.00305.006	CGR-B/363AE	B	3.6	10.8	2200	24
UM08A52	BT.00305.007	NCR-B/306AE	C	3.6	10.8	2900	32
UM08A52	BT.00305.008	NCR-B/307AE	C	3.6	10.8	2900	32
UM08B52	BT.00605.034	NCR-B/621AE	C	3.6	10.8	5800	63
UM08B52	BT.00605.035	NCR-B/622AE	C	3.6	10.8	5800	63
UM09A51	BT.00305.009	CGR-B/368AE	B	3.6	10.8	2200	24
UM09B51	BT.00605.045	CGR-B/6N9AE	B	3.6	10.8	4400	48
UM09B56	BT.00605.039	NCR-B/636AE	C	3.6	10.8	5800	63
UM09E51	BT.00605.052	CGR-B/6P3AE	B	3.6	10.8	4400	48
UM09E51	BT.00605.055	CGR-B/6P3BE	B	3.6	10.8	4400	48
UM09E52	BT.00305.011	CGR-B/373AE	B	3.6	10.8	2200	24
UM09E52	BT.00305.012	CGR-B/373BE	B	3.6	10.8	2200	24
UM09E56	BT.00605.050	NCR-B/646AE	C	3.6	10.8	5800	63
UM09E56	BT.00605.056	NCR-B/646BE	C	3.6	10.8	5800	63
UM09G51	BT.00305.013	CGR-B/372AE	B	3.6	10.8	2200	24
UM09H51	BT.00605.058	CGR-B/6P7AE	B	3.6	10.8	4400	48
UM09H56	BT.00605.059	NCR-B/652AE	C	3.6	10.8	5800	63
UM09H56	BT.00605.060	NCR-B/652BE	C	3.6	10.8	5800	63
AS10B51	BT.00605.061	CGR-B/6Q7AE	B	3.6	10.8	4400	48
AS10B5E	BT.00605.063	NCR-B/659AE	C	3.7	11.1	6000	66
AS10C5E	BT.00805.015	NCR-B/811AE	C	3.6	14.4	6000	87
AS10D51	BT.00605.062	CGR-B/6Q8AE	B	3.6	10.8	4400	48
AL10D56	BT.00605.064	NCR-B/663AE	C	3.6	10.8	5800	63
AS10D5E	BT.00605.065	NCR-B/669AE	C	3.7	11.1	6000	66
AS10H51	BT.00605.066	CGR-B/6R5AE	B	3.6	10.8	4400	48
AS10H5E	BT.00605.067	NCR-B/667AE	C	3.7	11.1	6000	66
AS09B5E	BT.00405.011	NCR-B/428AE	C	3.6	14.4	3000	44
AS10I5E	BT.00805.016	NCR-B/815AE	C	3.6	14.4	6000	87
AS10D56	BT.00405.013	NCR-B/431AE	C	3.6	14.8	2800	42
AS11A5E	BT.00605.070	NCR-B/690AE	C	3.6	11.1	6000	60
AS11B5E	BT.00805.018	NCR-B/819AE	C	3.6	14.8	6000	87
AS10D51	BT.00605.071	CGR-B/6T6AE	B	3.6	10.8	4400	48
AS10D51	BT.00605.072	NCR-B/6Q8BE	B	3.6	10.8	4400	48
AS10D5E	BT.00605.073	NCR-B/669BE	C	3.7	11.1	6000	66